AN EVALUATION OF RESULTS FOLLOWING RESECTION OF UNDERLYING BONE IN PLANTAR ULCERS IN LEPROSY

THESIS FOR MASTER OF SURGERY (ORTHOPAEDICS)







BUNDELKHAND UNIVERSITY, JHANSI (U. P.)

CBRTIFICATE

I am pleased to certify that the work

pertaining to "AN EVALUATION OF RESULTS FOLLOWING

RESECTION OF UNDERLYING BONE IN PLANTAR ULCERS IN

LEPROSY", which is being submitted as a thesis for

M.S. Orthopaedics was done by Dr. Harish Kumar

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This is to certify that the work and technique described in this thesis titled
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(HARISH KUMAR)

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INTRODUCTION

ROG is a chronic debilitating communicable disease. It has been prevalent since time immemorial almost over the whole world. SUSHRAT SAMHITA compiled by Sushrat about 600 B.C. mentioned the disease as VED RAKTA and ARUH KUSHMA. Other ancient Indian medical literature such as CHARAKA and VAGSMATTA also mentioned about this disease. Today about thirteen to fourteen million people are known to be suffering from this disease in the world, of which about 3.2 million are in India, scattered in various parts.

In the past leprosy has been described as a disease horrible to live with, difficult to die with. The fact is that a large proportion of leprosy patients do not have an active life. The recent chemotherapeutic remedies available, on the disposal of the physicians, are a great boon in treatment of leprosy, if diagnosed early. In neglected and late cases when deformities occur, surgical care is much needed, which if not available in time will make the life of a leprosy patient inactive and he would depend upon charity for maintenance even it has been burnt out or cured.

Hanson was first to isolate mycobacterium leprae in 1973, since then the disease is also known as Hansen's disease. Disease has got very long incubation period. The maximum incubation period reported is as long as 40 years (Dharmendra, 1978), the average incubation period being about 2 to 5 years. It involves the peripheral nerves. The componest nerves to be involved are ulnar, median, lateral popliteal, posterior tibial, branches of facial and sometimes radial nerve. Repeated and chronic neuritis of posterior tibial and lateral poplitual nerves or its branches causes damage and ultimate degeneration which lead to irreversible permanent insensitivity and motor paralysis of the foot. Gradually the chronic ulcers develop on the anaesthetic foot usually ever the weight bearing parts. These ulcers are named as plantar ulcers or neuropathic plantar ulcers. They are resistant to local and systemic therapy and even if they heal, rocus frequently.

complication in leprosy. It is most disturbing, crippling, disguisting and also one of the chief cause for social ostracism. Various welfare organizations and missions are working to dispel the fear and superstition that surround the word "Leper". The duty of the surgeon is to see, how crippling defect of the

deformities can be evercome and the patient gains his respectable position restored in the society, and may become an active member of the family. So as he is no longer a burden over the family, society and on the country as a whole.

The aims of the present study are as follows :

- 1. To study the causative factors of plantar ulcers in laprosy.
- To evaluate the efficacy of present surgical procedure "resection of underlying bone" in trophic ulcers.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

often intractable complications in leprosy. Ulceration of feet undoubtedly causes more unpleasantness for patient as well as his medical attendant than any other complication of leprosy. So much so that patient often comes to their medical attendant saying "Doctor my feet are killing me", as very correctly quoted by Ross (1962). The term 'plantar ulcer' was first introduced by Price (1959) who defined them as 'chronic ulceration of the anaesthetic sole of the foot, situated in well defined areas everlying bony prominences, resistant to local or systemic therapy, and characterised by marked tendency to recurrence'.

Hemerijkk (1959) in a study of 2,479 patients reported that 9,3% of all the lepers have planter ulcers on one or both feet. Ross (1960) in a similar study at the Schieffelin Research Sanatorium.

Karigiri observed very high incidence (25,30%) of plantar ulcers. Whereas in a similar study by him in E. Rigeria, the incidence reported is 10%. Srinivasan and Charmendra (1978) reported that 10 to 20% of leprosy patients suffer from this condition. If these can be

accepted as indicative of world incidence of plantar ulcers then, taking the W.H.O. estimate of total incidence of leprosy which is about 14 million, we have the alarming figure of 1.4 million patients with trophic ulcers of the sole.

Plantar ulcers occur on the under surface of the foot most commonly seen at the head of the matatarsal bones usually first and fifth. Less frequently they occurs at the heal or at the end of the toes (Dharmendra and Chatterjee, 1955).

price (1959) also observed the head of the metatarsals as the common site for these ulcers, distribution being 2nd, 1st, 5th, 3rd and 4th, whereas Keserwani (1976) observed 1st, 2nd, 5th, 3rd and 4th distribution and Kush Kumar (1979) observed 1st, 5th, 2nd, 3rd and 4th distribution. They also reported the high incidence of these ulcers in 4th and 5th decade of 115e with male predominance. On the contrary, Mukherjee (1977) reported head of the proximal phalanx of the big toe to be the commonest site for these ulcers.

and lateral border of foot (6 cases), heel (14 cases) and lateral border of foot (6 cases) were the sites for these ulcers as observed by Belsare et al (1979) in a study of 65 cases. In forefoot 2nd and 1st metatarsal heads were the most frequent sites reported. On the

contrary, Szinivasan and Dharmondra (1978) in their study of trophic ulcers found that not all parts of the foot are equally liable to ulceration. 70% to 90% of the ulcers occur in small strip of the sole (about 1° in width) across the forefoot in front of metatarsophalangeal joints. Even here, about half the number of ulcers occur in relation to the head of the metatarsal of big toe.

AETICLO Y AND NATURAL HISTORY

Ulceration of the foot in leprosy patients is seldom if ever, a primary manifestation of leprosy. This does not mean that there are no primary leprosy lesions of bone or plantar surface of foot. There are both, but these per se do not cause ulceration. Ulceration is, almost always, without exception due to trauma or pressure necrosis.

causation and persistence of trophic ulcers, various factors play a part such as sensory, trophic and circulatory changes. These are, due to interference with the nerve supply, trauma to the affected part pressure necrosis, repeated injuries, secondary infection after breach of surface leading to sepsis and necrosis of bone. In the case of ulcers on the end of the toes the important factor is the dragging of the toes along the ground due to foot drop.

appearance of a plantar ulcer is the climax of a series of changes that have occurred in the mechanics of the foot, leading to the breakdown of devices which protect the normal foot from damage during the stress of walking. These changes are represented clinically by damage in two areas which correspond to the surface on which friction pressure are maximal. These surfaces are between the plantar skin and the underlying bone at any given moment of walking roll.

Corresponding to these areas of stress, it is possible to recognise a deep and a superficial type of damage to the plantar tissues which culminate in a deep and a superficial type of damage

The natural history of plantar damage falls into three parts.

- 1. The pre-ulcerative stage,
- 2. The planter ulcer,
- 3. The complications of ulceration.

1. The pre-ulcerative stage :

when there is profound and prolonged deep anaesthesia of the sole, there may be no pre-ulcerative symptoms, the ulcer being the first complaint. With less deep anaesthesia, there is first burning pensation at one of the recognised sites of plantar damage,

continued, the burning sensation becomes accentuated at night in bed, and may disturb sleep. The patient limps, but may continue to walk until a further stage is reached which may include the cracking of a large callosity, or a swelling at margin of glabrous skin of the sole. At this stage, patient usually seeks treatment. The sign of pre-ulcerative stage are -

- (1) Localised swelling of the foot.
- (ii) Localised tenderness on deep palpation.
- (iii) Abnormal callesities of the sole.
- (iv) A localised blister at the margin of glabrous skin.

2. The plantar ulcer :

The plantar ulcer of the neuropathic foot of leprosy occurs either (a) As a deep and often chronic hole corresponding to damage to tissues close to bene, or (b) As a superficial and often acute ulcer, corresponding to damage at the superficial area of friction damage.

(a) Deep type of plantar ulcers :-

This is the common chronic ulcer on the sele
of the foot in legrosy, though it may be masked by
associated long standing secondary infection. When
this infection is minimal, it is seen to be a collar-stud

type of hole leading from the skin surface through a funnel which opens into the necrotic area adjacent to the underlying bone. Neglected necrosis blisters frequently initiate a deep ulcer.

(b) The superficial type of ulcer :-

of skin and may or may not include deeper tissue.

It is not as common as deep type, serious secondary infection is inevitable and the damage to the foot may be considerable. A similar ulcer is also seen under the head of the proximal phalank of big toe, at the tips of the toes and at heel.

changes in leprosy to be most significant in the actiology of the trophic changes of the foot. The various positions of foot shifts the weight-bearing to the lateral surface of the foot and away from the normal weight-bearing area to an area that is considerably smaller in size. Added weight is placed on the head and base of the fifth metatarsal and calcaneus. These bony prominences cause pressure necrosis of underlying tissues.

Secause of foot drop, and the high stepping gait necessary to advance the foot, and because of the varus position of the foot, the forefoot and in particular lateral part at the level of fifth metatareal head and less often, the great too, with its associated first metatareal head, are frequently dragged along the floor, causing repeated abrasions of the integument in these areas, which finally break down, with ulceration and secondary infection, and may eventually go on to esteemyclitis of these bones.

In a normal foot the part of the calcaneus that is weight bearing is usually a relatively flat surface parallel to the floor. There is frequently an outgrowth of bone along the plantar fascia that forms the calcaneal spur. In the normal foot this is also parallel with the floor. In leprosy patients with paralytic pes planus this anatomy is disturbed. The normal longitudinal arch of foot is lost. This results in small spur of bone, or atleast an irregular surface of the os calcis, causing much greater pressure on a very small area of integument which may result in a pressure necrosis, ulcoration and osteomyelitis of the calcaneus.

The neuromucular involvement may lead to the formation of a claw-or hammer-toe deformity, this brings the lancet-shaped tip of the bone in contact with the weight-bearing integument. Here again a sharp irregular bony structure is causing pressure on a wary small era of integument rather than a large flat area.

This situation leads to ulceration of the tip of the toos. If the claw foot is very marked it will cause the toes to be in marked dorsal flexion. Thus an added burden is placed on the metatarsal heads, Mormally took have not much value in weight bearing. In normal feet however, they bear some weight, more in walking then in standing. They do help the distal transverse metatarsal arch to a considerable extent in its weight bearing functions. If the toes are no longer in contact with floor the whole burden of the forefoot weight bearing is thrown on the metatarsal heads and this added strain may be just enough to cause trophic ulcers. In fact, this is such a common association that one almost always finds ulcors at the level of the metatarsal heads in the foot with claw foot deformities. Similarly Seddon (1960) attributed fixed deformity to be the important factor.

Although there are vasquiar changes of the foot in leprosy patients these play a rather insignificant role in actiology of trophic ulceration, whereas Job (1960) states that defective circulation due to irreversible changes in blood vessels play some part.

noss (1962) states that ulcers on the sole due to lepromatous leprosy per se are very rare, less than 1% of the total. The ulcers occur on feet which are both ansesthetic and walking. He divided ulcers into two groups.

- 1. First ulcers on virgin feet.
- Recurrent ulcers on previously demaged feet.

1. THE PARSE ULCER

- (a) Casual trauma: Some ulcers are caused by cuts, burns, there wounds, surface friction blisters and injuries due to badly fitting shoes or badly made shoes, e.g. nails, stitching into the sole. The natural history of such an ulcer is break in the skin, often quite minor, un-noticed by the patient the continues to walk. The wound becomes infected. There is local codoma and regional lymphadenopathy and the wound, subjected to trauma of walking, fails to heal.
- (b) Plantar warts : Occasionally, ulcors occur under plantar warts and they are semetimes seen after unskilled cutting for corns or careless removal of callosities.
- (c) Cracks: Another reletively uncommon cause of ulceration is the infected crack. Deep cracks may extend to the subcutis and provide an opening for becilli and beginning of an ulcer. These cracks are commonly found at the lateral margins of heel and at the flemor crease in the forefoot.
- (d) Subcutaneous necrosis : The casual trauma, plantar warts, and infected cracks account for only a

small proportion of sole wounds. These three show, first a break in the skin, then becterial invasion and then a septic superficial ulcer which is unless localised, cause apreading inflammation. But the true and common plantar ulcers begins as a deep necrosis, often at its first appearance penetrating from the skin to plantar fascia or tendon sheath.

both anaesthetic and walking. The friction forces set up within the foot during walking lead to mochanical damage to the tissues and eventually necrosis and ulceration; which is confirmed by the fact that the distribution of the ulcer corresponds to the distribution of friction forces in the foot while walking (Figure 1 b).

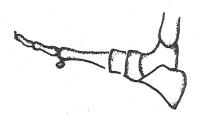
The relationship between forces acting on the foot during walking has been studied by Barnett (1956), Brand and Fritschi (1957) and Price (1958 and 1964).

Barnett (1956) divides the period during which the foot is partially or wholly in contact with the ground in walking, about three-quarters of a second for each step, into 5 phases, which together constitute the walking roll.

S TANDING PRESSURES 50% (0) (OFTER MORTON) F16 1(a) KARIGIEI ULCER STUDY DISTRIBUTION OF ULCERS Bis. 1 (b) O Jes 1/122 29.2% THE MALKING ROLL (NOTER MORTON) Fig I(C)

THE WALKING ROLL

Fig [[(a)



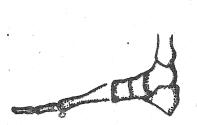
HEEL PHASE 15%

Fig [[(b)



FOREFOOT PHASE 49%

F16 11 (C)



Fiell(d)



STANDING PHASE 35% TAKE OFF PHASE 10%

FIG. II.

- 1. The roll begins with the impact of the posterio-lateral aspect of the heel on the ground quickly followed by the complete heel. This phase occupied 15 to 20% of the cycle (Figure 2 a).
- 2. It is followed by the standing phase in which heel, outer side of sole and material heads are in contact with ground. This phase occupies 30 to 35% of the total roll and during it the distribution of pressure is much the same as during standing.
- which occupies 10% of roll, the weight is borne only on the metatarsal heads, the heel rising from the ground and extension taking place at the metatarsophalangeal joint is occasionally absent as a separate phase.
- borne on the metatarsal heads and the toos, the hallum and 2nd too predominently. The heal continues to rise and further extention occurs at the metatarso-phalangeal joints. The metatarsal heads will retate as much as 40 degrees and as the skin is fixed to the ground this rotation is absorbed in the tissues between the skin and metatarso-phalangeal joints. It is during this phase that maximum forward thrust occurs, resulting in compassion forces behind the metatarsal heads, and

- (a) Scarring and loss of friction reducing mechanisms: Scar tissues being rigid and having poor blood supply,
 is much loss able to withstand the stress forces
 set up in the heel and forefoot during walking than
 normal. In addition to scarring the smooth
 cartilagenous surface of the normal metatarsal head
 has been destroyed, already abnormal tissues are
 literally ground between the rough metatarsal head
 and the walking surface. Such Seet may re-ulcerate
 after as little as 15 minutes of walking.
- (b) Necrosis blisters :- This is a subcuticular collection of tissue fluids with black necrotic debris floating in it which is usually sterile. The fluid has tracked under the plantar skin from a deep seated sterile necrosis at the site of previous ulcer. If patient continues to walk, the blister ruptures, infection supervenes and an infected wound results.
- (c) Fixed Deformity is Fixed deformity do not appear to play such an important part in causation of ulcoration in leprosy patients, but Seddon's (1960) statement serves to underline the difficulties that ensue when secondary fixed deformities are allowed to develop and the extreme importance of detecting the pre-ulcor and thus preventing the bone and joint infection that so commonly lead to fixed deformity.

(d) Intermetatareal ulcors: - Small cysts (Kulonski and Olriman, 1936) containing organisms are commonly present in anaesthetic feet which at one time or another had plantar ulcors may flare up at any time causing acute septic inflammation in tissue of the foot. The nidus of infection may be in the bone, particularly metatareal or calcaneum, in cartilage or tendon or in subcutaneous tissue. It may contain a small foreign material, such as a thorn or a piece of dressing or it may simply contain purulent material or bacteria. The factors which cause such cyst to become active after as much as 9 years are not known but clinical picture is clear. The patient presents a hot swellen, painful foot, with lymphadinitis.

Anderson (1964) also described 'Rell' to be the crucial factor in setiology of plantar ulcers. The majority of ulcers appear to develop from 'necrosis blisters' which are initially storile and only after break through become infected. The further development can be describe as evil cycle of 'scar, ulcer, scar'. If left unchecked, the deeper structures, bone, joint and tenden are involved.

Price (1964) also described the actiology and natural history of plantar ulcers in four phases (1) Primary tissue damage, (11) Primary plantar ulcer, (111) Collapse of Sect. (1v) Appearance of secondary ulceration.

Srinivasan and Mukherjee (1964) classified the ulcer in following groups.

- 1. Uncomplicated :- Those without involvement of bone or other complications but are indolent and not healing with 'routine' treatment. These ulcers shows heaped up and overhanging edges and may be deep, penetrating or oven perforating the whole foot.
- Complicated :- Ulcer with involvement of bones and joint or tendon sheath or those which present gevere deformities.
- 3. Extensive :- Ulcer that extend over a large area.

 These may also be considered as a variety of complicated ulcers.
- 4. Recurrent ulcers :-

Srivastava and Reservani (1976) mentioned following factors responsible for causation of trophic ulcers **

- Sensory, trophic and disculatory changed in the part due to interference with nerve supply.
- 2. Trauma to the affected part due to pressure and repeated injuries.
- Infection after breach of skin surface leading to sepsis and necrosis of bone.

Multherjee (1977) described three primary causes of neuropathic plantar ulcers.

- 1. Injuries from cutaide.
- 2. Injuries from within the Soot.
- 3. Infection.

MINA WIN

Conservative :-

In the treatment of all ulcers whether they affect bone or not, the fundamental principles are to cleanse the ulcer and endeavour to encourage the formation of healthy granulation tissue, and then to protect the granulations and thus aid healing.

chaulmoogra oil had been used in the treatment of leprosy in India from ancient days. Sushrata (600 B.C.) mentioned "tuvarka" as a potent remedy against leprosy.

to that used for varicose ulcors, namely with the log raised and vein emptied overlapping pieces of adhesive strapping are firmly placed over the ulcor, the strapping is left until it ultimately separated by the gradual scaking of the emudate from the ulcorating surface. The chief objection to this method is that foul smell from the dressing is usually

complained by the patient and the nursing staff naturally dislike such a method.

Cochrane (1940) used similar method but filled the cavity with 5% sulphanilamide pasts (sulphanilamide 5 gram, Adep Lanae - 70 gm and Paraffin liquid - 25 gm) and leaving it for a week. The results of this method were encouraging and where the ulcer is not excessively dirty than this method saves dressing and encourages healing.

Rysi (1936) advocated the sysinging of sinuses with 1:20 solution of Detol.

Low and Chatterjee (1937) and Chatterjee (1955) recommended injecting the trophic whose once a week with hydrocarpus oil. \(\foatsize{1} \) c.c. of the medicine is injected at each puncture. After the injection the whole is dressed with same remedy used for injection. Similarly, Cochrane (1940) used hydrocarpus oil and cod-liver oil in alternate cases and found that whose heal just satisfactorily with either remedy. All the whole who heal just satisfactorily with either remedy. All the whole injection there was much thickening of bone and specially if there was much pain associated with periostitis or if there was not an adequate covering of subcutaneous tissue over the head of the metatarsal bone injection treatment failed.

Mehta (1938) reported very encouraging results in treatment of trophic ulcers by using solution containing Rivanal for injection into subcutaneous tissue near the ulcer and into the neighbour of nerve supply of the part. Das (1946) used same solution with addition of Eaflavine and Trypaflavine for intravenous injection. Mealing was obtained only in 14.7% of the patients.

Charderizar and Collier (1939) have recommended the eintment containing Mercurochrome (2 oz), Honey (2 oz), cord liver oil (8 oz), Zink exide powder (4 oz), Bismuth submitrate (2 oz) and Vaseline (13 oz) but this eintment is extremely expensive.

such as electrolytic chlorine lotion, chaulmoogra oil, Brilliant green, Eluprocin in various dilutions, acriflavine, mercurochrome, saturated solution of magnesium sulphate, 30% solution of Dettol and cintments of various kinds and observed little improvement. The results of Dettol were best of these remedies. But as soon as patient start walking the ulcers were same as before. With this he concluded that rest is an important factor in treatment of trophic ulcer.

Lang (1940) used a mixture of Eucalyptus oil with iodoform (grs. 10 : oz 1) for cleaning of where

and when the grannulation tissue has commenced equal parts of castor oil or olive oil is added to provent sticking of drossings owing to tendency of the eucalyptus oil to evaporate.

twice or thrice a day and found valuable for eleaning ulcer and encouraging the formation of healthy gramulation tissue. Once the granulating surface is clean and healing commenced them a protective dressing was applied. He used either the Eucalyptus oil and iodeform with equal parts of caster oil as used by Lang (1940) or an eintment containing acid boxic, oil Eucalyptus, Bismuth submitrate, Einc oxide, Caster oil. He further observed that if grammulations are excessive, painting with 272% solution of silver nitrate is sometimes effective. However, he continued dressing with cusol in presence of much occing.

with the by product of Dapsone. He studied 22 cases and found that within a few days of starting the treatment the discharge from the ulcer diminished and was totally eliminated in a short time. In 15 cases the ulcer completely healed and there was no relapse during one year. In the remaining cases although the ulcer become smaller cleaner and drier but they did not heal completely even after treatment

for 8 to 12 months. X-ray examination showed no abnormal changes in first group (ulcer healed). In all the cases of second group (ulcer not healed), chronic sclerotic and destructive changes were found in phalanges and/or motatarsals. Thus correlation between the results of treatment and changes in the small bones of the feet brings out the fact that complete and permanent healing of trophic ulcer can not be expected if diseased and dead bone lies at its bottom. For permanent healing in such cases the diseased bone has to be removed.

Samena and Mathur (1963), Mathur and Samena (1965) and Mathur (1965) have shown beneficial effect of local application of priscol in leprosy deformities and ulcers. Whereas Mathur et al (1966) treated 25 patients of ulcers with perineural priscol injections and observed encouraging results.

Multherjee (1968) suggested the use of three type of dressings (1) sterile dressings, (2) Sterile dressings with topical entiseptic cintment, (3) Chlorinated lime with boxic soid solution wet dressing. He claimed that 80% of the ulcers healed in this way.

Operative :-

Paul (1936) was the first who described metatarealectomy for these ulcers. The operation was done under tourniquet after devascularizing the limb. approach to the extremely bad forefoot with well conserved hind-foot. He sacrificed the whole offending area in order to stop once and for all the tendency of the scar to 'creep backward'.

The use of plaster of paris cast permits healing if it is continued long enough. The earliest reference to this appears to be that of Khan (1939) and represent the application of principles enuclated by Trusta in the treatment of war wounds during the Spanish civil war. He studied fifteen cases in 3 batches.

The first batch : He removed bone in five cases and scraped the infected area and immediately applied the plaster case. Three were cured within 4 to 8 weeks.

In one plaster had to be removed.

The second batch : Ulcers were curetted and plaster case given. Three were cured within 4 to 8 weeks, one ran away and one died of pulmonary tuberculosis.

The third batch : Plaster case only. Three were cured within 6 to 10 weeks. In 2, the plaster had to be removed. Here it took longer for ulcer to heal and necrosed bone came out in pieces.

By this he concluded that rost and protection from pressure are important items in the treatment of leprous trophic ulcers. Paul (1947), Fisher (1955), Bose (1955) and Price (1959) also confirmed success of this method.

Cochrane (1940) treated these ulcors by metatarsalectomy as adviced by Paul but packed the cavity left after removal of a metatarsal bone with 5% sulphanilamide paste and leave the dressing for a week. The result were excellent even when a greasly infected bone has been removed.

Drisebach (1959) gave following principles of treatment for trophic ulcers.

- (1) Prevent further trauma to the foot; This usually means rest. The feet should be elevated especially if there is any evidence of codema or cellulities of the feet. If there is associated cellulities, lymphangities, or regional lymphademities, the appropriate chemotherapeutic agent should be used in full docage. Continuous het saline fementations or frequent hot saline 'soaks' are of great value.
- (2) In long-standing chronic ulcer it is of value to debride the surrounding hyperkeretic skin and overlying eacher. Not fomentations and/or scake and the mechanical cleansing of the ulcer is of greater

importance in obtaining early healing than any medication that is put on the ulcer. Once the ulcer is cleaned up, and there are no longer signs of infection of the surrounding tissues, the foot could be immobilized in a walking plaster of paris cast. The pre-requisites for a plaster boot are (1) A clean healthy ulcer, (2) No cellulitie, (3) No underlying ostoomyelitis of the bones of the foot.

Once these ulcers heal, and foot goes back to weight-bearing they may occur. Prevention of further trauma is all that is necessary. Usually an inexpensive subber soled canvas shoes is all that is needed, or a 'native' sandal if it is so made as to cause no injury to the foot.

necrosis, various types of foot wears have been used by various workers or alternative is to remove the bony prominence that cause the pressure necrosis ulcer. Metatarsal head should be excised with the object of maintaining as much of the length of the shaft of the bone as possible. The incision should be away from the plantar surface of foot. In some cases where there are multiple ulcers in relation to the distal metatarsal arch it may be necessary to remove the head of all the metatarsal, in other words to do a transmetatarsal amputation. This has been found to be

a good procedure. A technique that saves all the toes rather than the classical procedure where they are amputated.

For the ulcers of heel, a fish mouth incision is made which reflects the heel pad distally. Then with an estectome the plantar surface of the calcaneus is flattened so that there is no protruding bone that may be source of further pressure necrosis. In case of estecomyelitie of metatarsal bones or of a single tarsal bone, it is usually advisable to do a surgical removal of the sequestrum, or empise the affected bone or a portion of it, or currete the tarsal bone.

In some cases inspite of all efforts, an emputation of some kind become necessary.

In the case of a large plantar ulcer skin grafts also have their place, but only in well selected cases of large ulcers, without much loss of subcutaneous tissue and in which there is no osteomyelitis of the bones of the foot.

Price (1960) described treatment of Plantar ulcers according to stage of ulcer.

1. Pre-ulcerative stage :

The patient is put to bed with foot end of the bed raised though he is allowed to move with the help of crutches to perform his toilet. Within a week or ten days, orders and tendernoss disappear and patient resumes normal activities with rigid sole foot-wear. Alternatively, the patient remains in bed for three days until initial orders has subsided and a plaster cast is then applied to enable him to be ambulant.

2. Stage of plantar ulceration :

After control of oedema and infection by a few days in bed, the plaster cast is applied. The cast is removed after 6 weeks. In this time ulcer heals, if not healed cast re-applied until healing occurs. To prevent recurrence of ulcer adequate foot wears are provided.

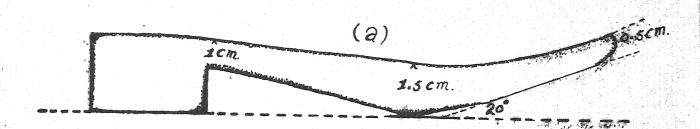
3. Healed ulcers :

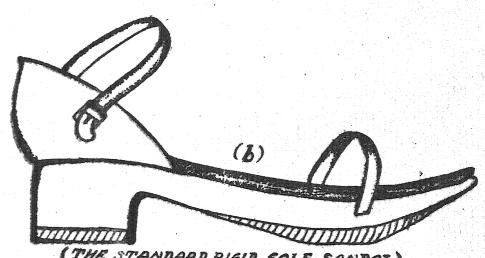
For these special foot-wear with a rigid sole and soft insole are provided.

The Standard Rigid sole Sandal :-

The sole of the sandal is prepared in wood, and uppers in leather and the insole in spenge rubber. The best materials depend on local conditions.

work for soles. It is easy to obtain and can be worked by local craftman using their traditional tools. The shape of the sole is indicated in Figure III a. He gave importance to following :





(THE STANDARD RIGID SOLE SANDAL)

) THE WOODEN SOLE. THIS MUST BE LONG ENOUGH TO PROTECT THE TOES, AND RISE SHARPLY ENOUGH FROM THE METATARSAL PAD TO MAKE POSSIBLE THE ROLLING MOVEMENT NEEDED FOR WALKING.

THE COMPLETE SANDAL. THE LEATHER HEEL PIECE INCORPORATES A HEEL STIFFENER; THE STRAPS ALSO ARE OF LEATHER AND ALL ARE LINED WITH FELT. THE INSOLE IS SPONGE RUBBER BONDED TO CANVAS AS USED FOR CARPET UNDERLAYS. THE HEEL AND SOLE ARE PROTECTED BY RUBBER; SPECIAL SIZES AND SHAPES ARE OBTAINABLE FROM CLOG MANUFACTURERS.

FIG. III

- (1) the patient's foot should slope slightly downwards, from heel to metatareal heads;
- (ii) the sole then rises sharply to the toe of sendal;
- (111) the point of contact of the forefoot underlies the metatarsal heads of the foot, and the sole than rises at an angle of 20° to the ground.

must be soft enough not to chafe the skin. The heel is stiffened by a heel stiffner that fits between two layers of leather as in a pocket. The heal piece must project a definite distance up the back of the heel; if it is too short, it tends to leave the heel at the end of the step, while if it is too long it will cause a friction sore at its upper end. The straps are of soft leather and are lined with a half thickness of 1/2 in, grey orthopsedic felt, using an adhesive.

The insole is made from one of the type of rubber. The complete sandal is fitted to the petient and may need slight modification. The petient is observed daily for the first few days. In some cases, it is essential to provide short socks, when the skin is particularly susceptible to injury.

Deformed feet can not be satisfactorily fitted with standard sandals, and in most cases it is necessary to make special foot-wear. Grossly deformed feet may need amputation.

Ross (1962) treated his cases on the principles of Truetta (1944). He recommended following treatment depending upon the type of ulcer.

1. THE VIOLENTLY APPECRED WOUND :

These are found in association with hot swellen feet with inguinal adenitis and with copious discharge from the wound.

- (1) Cleaning of the wound : is done by warm water and soap.
- (ii) Excision of dead tissue: Anything obviously dead should be removed, alongwith the fibrous scars at the edge of these wounds to allow epithelium to grow.
- (111) Allowing free drainage : If drainage is not proper even after thorough debridement then further incision and if necessary, excision of healthy tiesue, must be done until the wound is no danger of becoming an abscess.

- (v) Prevention of cross infection : is done by encasing foot in plaster of Paris cast.
- (vi) Prevention of repeated trauma: The Plaster of
 Paris cast entirely cuts out the walking roll
 which is the underlying cause of most of these
 ulcers. If the discharge has not ceased and the
 smell subsided in two to three weeks after the
 application of the plaster, then the plaster should
 be removed under asoptic conditions and the wound
 re-examined. It is usually found either the
 drainage is inadequate or that a previously
 undetected sequestrum is present.

2. THE CLEAN DRY ULCERS :

They may be treated along the same lines but bed rest is not necessary and they can be sent home in a weight bearing plaster of Paris cast, or "Karigiri Boot". It is cheap, costing approximately 5/-, effective, acceptable to the patients and can be applied to out-patients who have to go home the same day.

3. THE MILDLY INFECTED ULCERS :

were treated by cleaning the wound with scap and water scake, excision of dead tissue, providing free drainage and immobilization of the part in plaster boot.

These patients are put on strict bed rest "patients must not walk on wounded feet".

4. THE INFECTED GRACK :

The large majority of these heel in 2 to 4
weeks if the edges are excised, the wound cleaned and
then immebilised by strapping a wooden rocker with a
felt insole on to the feet by means of elastoplast.

If there is sinus associated with a crack, then excision
to provide free drainage and immobilisation in a weight
bearing plaster of Paris cast is essential.

There are three adjuncts to the treatment.

- (i) Antibiotics.
- secondary to paralysis should be corrected. Toes which are twisted and rigid, should be removed. The only bone cutting operation which commends itself is the removal of spur of bone from the underside of the calcaneus which is commonly present following an ulcer on the heel. If sequestration occurs, remove the sequestrum but normal metatarsal heads should never be removed.

(111) Accorbic acid.

Ross (1964) treated 502 cases of plentar ulcers on this basis and reported good

results in all except six, 4 of them were treated later by metatarsal head resection and 2 by amputation.

Andersen (1964) is of the view that when active ulcoration is present surgery should be limited to securing free drainage only. In this stage one should never remove anything obviously dead tissue, at the number of times evidently dead tissue when left under a Plaster of Paris cast, proves very vital indeed.

while the ulcer is freely draining, and while there is eedema and swelling, bed rost with elevated foot is the only sensible treatment. As soon as ordered subsided and ulcer is dry patient may be made ambulant in a well fitted Plaster of Paris cast, with a socking device preferably a Schlar iron. The majority of the ulcers will heal within air weeks. To prevent recurrence of the ulcer protective foot-wears were used.

sginivesen and Numberjee (1964) described a more radical approach in the management of chronic foot where. They recommended thorough debridement of all aspects of wheer i.e. edge, floor, track, abscesses, base and underlying bone. They performed sequestrectomy or sewcerisation rather than metatarsectomy. In severely destroyed and deformed foot they have recommended salvage

procedure, so that the removal of offending part will make the patient ambulant with or without prosthetic device.

resection of metatarsal bone through a dorsal approach in cases of recurrent ulceration in leprosy. They resected the metatarsal subperiesteally close to the base of the bone, preserving tenden and vessels. Wound was closed only by few catgut sutures, skin was not sutured and was allowed to heal by secondary intention in a below knee plaster. To provent recurrence after healing of ulcers they used footwears a shoe with a build up of the forefoot and toe cover.

They treated 16 feet of recurrent plantar ulcers by this method and reported that 10 cases have remained free of plantar ulcers, 5 of these have been ulcer free for 2 years or more, and 4 have remained ulcer free for 4 years.

Andersen (1975) recommended the transverse metatorsal head resection as a surgical approach to the problem of recurrent forefoot ulceration. The indications are any kind of forefoot ulceration or forefoot scarring. Contraindications are ulceration and/or scarring of the mid or hind foot since such conditions would not permit safe weight-bearing on the reduced foot.

The operation aims at removing sufficient amount of sheleton from the forefoot so that the cut ends of the metatarsal bones are well proximal to the proximal edge of the ulcer/scar. This permits a trouble free take off phase.

The incision is made transversely on the dorsum of the foot, at the level of proposed osteotomy of the metatarsal bones. The incision is carried down to the bone. The metatarsal bones are divided subperiosteally in a straight transverse line. The distal portion of the bones are twisted out, including the metatarsal heads. Sesamoid bones if any must be removed. The resulting gap is loosely packed with plain vaseline gause. The foot is dressed in a bulky dressing. However there are few variations to the technique.

In cases of septic arthritis removal of metatarsophalangeal joint as a whole is indicated. The another variation being removal of all the remnants of bone distal to metatarsophalangeal joint along with distal part of metatarsal. The indication being absorbed forefoot, that externally look rather like a forefoot amputation, but has a very thin, adherent-plantar tissue in the take-off area.

Srivastava and Keserwani (1976), Keserwani (1976) treated 32 and 64 cases respectively of plantar

ulcers by pre-operative plaster of Paris cast to give rest for 2 weeks under cover of systemic antibiotic therapy. When the discharge stopped, oedema subsided and granulation tissue started appearing, the cases were subjected to thorough debridement of the ulcer and metatarsectomy through the dorsal incision, they excised head and neck of metatarsals preserving the tendens and immebilized the foot post-operatively in below knee Plaster of Paris cast, till the ulcer healed. To prevent recurrence patients were advised to use micro-cellular chappals. They reported very gratifying results of this technique and observed that gait was not affected.

the metatarsal heads. Superficial ulcers were treated by plaster immobilisation and split thickness skin grafting if needed. Uncomplicated deep ulcers were treated by curettage and debridement whereas deep ulcers were treated by pre-operative plaster of Paris cast, metatarsectomy through a dorsal incision, as done by Kaserwani (1976). He reported best results with metatarsectomy.

by split skin graft and reported replacement by full thickness skin was not necessary. Even the large ulcers of the heel healed by this method and there was no problem even after three years.

cases of plantar ulcers by excision and thin split skin graft and reported that healing occurred in 20 days in 2/3rd of his cases. 75% of the total cases healed after first operation and 90% after the two operation. In the later case the period has been four to five weeks. Majority of remaining 10% of cases had large deep lesions of the heal, the size of ulcer reduced by the procedure and eventually healing took place.

D'Hooghe and Hendrickx (1975) compared the results of treatment following skin grafting and plaster immebilisation. Plaster of Paris treatment has the advantage that it enables the patient to be ambulatory. Disadvantage being that it prevents control of wound and the early detection of complications. Purther the wound heals by scar tissue, which is an inadequate substitute for skin, which especially in a weight-bearing area, must be strong and elastic. The skin grafting of ulcers therefore must be performed whenever possible. They are also of the view that skin graft should not be taken from insensitive area of the leg, because denervated dermis however is usually thinner than normal and the adnexae, hair follicles and skin glands which contribute such to the healing and re-epithelisation of the donor area may

also be atrophic, so that delay in healing of the donor area and sometimes less of full thickness skin.

the changes in the posterior tibial nerve and vessels because of compression in the fibro-osseous tunnel and used decompression of the posterior tibial neurovascular complex for the treatment of chronic plantar ulcers with posterior tibial neuritis. They reported that 53 of 58 cases of plantar ulcers healed in short period after the decompression.

Pelsare et al (1979) treated 65 cases of plantar ulcers in leprosy by various surgical procedures.

- (i) Curettage with or without decompression of posterior tibial neuro-vascular complex in superficial ulcers.
- (11) Metatarsectomy with or without decompression of posterior tibial neuro-vascular complex in deep ulcers, where bone was infected or presenting as a pressure point.
- (iii) Curettage with skin grafting with decompression of posterior tibial neurovescular complex in heel ulgers.
- (iv) Amputation of toes in gangrenous cases.

They encased the feet in plaster cast till the ulcers healed. Best results were observed after decompression of posterior tibial neuro-vascular complex along with other surgical procedures. The recurrence rate was 25 to 30%, maximum being in first six months.

Pati et al (1931) reported his observations following treatment of 57 metatarsal head plantar sores in 43 patients treated by excision of the head. Removal of effending metatarsal bone was done either by plantar (9 cases) or dersal approach (48 cases). Recurrence was not observed even in a single patient. However, 5 cases hed metatarsal head pressure sores at other sites. The ulcors healed faster by dersal approach.

MATERIAL AND METHODS

MATERIAL AND METHODS

The propent work is based on the study of 33 ulcers in 30 patients suffering from the leprosy with plantar ulcers, admitted in Maharani Laxmi Bai Medical College Mospital, Jhansi.

patient department were carefully examined for plantar ulcers and only these who had neglected ulcers were included in this study and admitted. Detailed history regarding duration of illness, duration and sequence of plantar ulcers, predisposing factors like trauma etc., family history, socio-economic history, other complaints if any, treatment already taken were recorded. Detailed clinical examination was also done and recorded as follows:

Case No.

Massa s

. .

Age/Sex :

Address :

Occupation :

Ward/bed :

Social status :

D.O.A. B

D.O.D.

Chief complaints

Duration

- 1.
- 2.
- 3.

M/o treatment

For Laprosy

- Taken Regular/Irregular
 - Duration
 - Type
 - Not taken.

For ulcer -

Past History :

- 1. Suberculosis.
- 2. Diabotes Mellitus.
- 3. Trauma.
- 4. Others.

Pandly History

Examination :

1. Gait

Examination of ulcera

			No. of the Control of			proposition more and the		
The south of the					Di See	Local	Tender-	Charles and Park
Foot	2440	614 mm	Margins	Ploor	min sarrotti	Temps.	ness	Ch despendent
2006	CONTRACTOR	distribution			Sept. C. mindre at 610th.	the annual St. Ma		
erageigeageas and geographics		STATE OF STREET STREET,	TO DESCRIPTION OF THE PARTY OF					
			•					
								Landon State Commence
	ă	ä	8	A	AND REAL PROPERTY OF THE PERSON OF THE PERSO	Mary to the water to the second	Alexander of the second of the	

Deformities :

Condition of peripheral nerves :

90 00 004400. gagaa	llorvo	Rt.	I.t.	
A. 1	n lower limb -			
	1. Let. popliteal		Miller	
	2. Post. tibial		in construction of the second	
	3. Others			
D. I	n upper limb			
	1. Ulner			
	2. Median			
•	3. Others			
G. Q	thers -			

Sensory examination of foot :

Distribution of Norve	graduation and the second sec	
Medial Plantar		
Lat. Plantar		

L vestigations :

1. Blood :

TIC

ESA

Mb.

2. Urino :

Albumin .

Sugar

ME

2.	(A) E	lood urea :		
	(B) B	lood sugar :		
4.	Pus s	wab culture	400	
	Organ		Sensitivit	
5.	X-ray	1		
014	PD04	<u>a</u> :		
I	Dataon			
1.	250=0	perative :		
		- Antibiotic	10	
		- Antileprot	10	
		- Others.		
2.	Opora	tivo treatme	nt i	
		Date	Anaesthesi	
	Steps	\$		
3.	Post	operative tr	estment :	
	FOLLO	V-III		
	Date	Galt	Examination of wheat	Treatment
	and the second s			The state of the s

Total duration of immobilisation :

Final Results :

Treatment : It was carried out under the following plan.

- 1. Treatment of the disease
 - 1) Specific drug treatment
 - ii) Supportive treatment.
 - 111) Physiotherapy and exercises.
- 2. Treatment of trophic ulcars.
- 3. Rehabilitation.
- 1. Treatment of the disease :
 - i) Specific drug treatment: The patients were given following drugs as per dosage schedule recommended by W.H.O. (1982).

Rifampicin : 600 mg once monthly, supervised.

Dapsone : 100 mg daily, self-administered.

Clofazimine : 300 mg once monthly, supervised and

50 mg daily, self-administered.

- ii) Supportive treatment: It was given in the form of antibiotics, haematinics and analgesics to improve the body resistance, to relieve pain and to improve local condition of the ulcers.
- iii) Shysiotherapy and exercises : Patients were advised gentle massage for deformities of the joints and active/passive exercises of the affected part.

2. Treatment of trophic ulcers :

The aim of treatment was as follows :

- 2) Eliminating the stress, i.e. by avoiding weight bearing in acute stage.
- 2) Sradicating the infection by adequate local treatment: The wound cleaned once or twice a day depending upon severity of infection, with savion and dressed with Eusel till frank discharge from the ulcor ceased.
- 3) Prevention of recurrence of ulceration by removing the internal stress: It was achieved by exicision of offending bone.

OPERATIVE TREATMENT :

I. Angesthesia :

In cases with complete less of sensation of foot no anaesthesia or analyssia was necessary. In cases with partial sensory less the Pentasocine with Diagepan by intravenous route were used.

II. Operative Technique

Part was cleaned, painted and drapped with apoptic measures. Trophic ulcers were excised in toto. The resection of offending bone was done either by dorsal or plantar approach as below -

A. Dorsal Approach :

In cases where bone was not exposed through the ulcer the dorsal approach was used. A longitudinal incision was given over the dorsum of the foot along the bone to be resected. The bone was cleared off all the soft tissues, and exposed subperiosteally. The prominent part of bone was excised. Care was taken not to leave any spike of bone projecting plantarwards. Any loose piece of bone removed, wound washed thoroughly with normal saline and closed in layers. The plantar sore were thoroughly debrided and cleaned. Both the wounds dressed separately with entiseptic ointment. Below the knee well padded Plaster of Paris cast given in neutral position.

Technique of applying Plaster cast :-

cotton from tibial tubercle to the toes. A long posterior slab made of about six layers of plaster bandage is laid so that the slab extends a little beyond the toes distally and covers the lower three quarters of the calf proximally. The bony prominences are protected by cotton padding. Then plaster bandages soaked in warm water are wound round the limb. As a rule the bandage laid on the limb and gently unrolled. Tight turns of the bandages are avoided. As the plaster bandage is being applied plaster paste gently rubbed on the plaster cast. The plaster cast is them manually moulded to a proper fit

ever the contours of the limb. In these cases the lewer end of plaster may be completely closed. If there is any doubt that the plaster cast is tight and swelling of part is expected then toes are left open for inspection for 48 to 72 hours. After this it is better to cover them completely with few turns of plaster bandage. This prevents re-infection of wound from outside.

B. Plantar Approach :

In those cases where the offending bone was exposed through the ulcer. After thoseugh debridment of the ulcer, two vertical incisions were given at 12 0° clock and 6°0 clock positions to enlarge the openings. The offending bone was cleared off all the soft tissues and ulcer bearing part of the bone was excised completely. The wound was closed only by stay sutures, cleaned and dressed with antiseptic cintment. A well padded below knee Plaster of Paris cast given keeping the foot neutral position, as described in dersal approach.

All the patients were instructed not to bear weight on the operated limb.

After treatment :

Plaster was removed after three weeks untill and unless there was foul small, maggets or plaster was

broken. Wound was inspected, stitches were removed and plaster reapplied if wound had not healed completely. Plaster was discarded finally when ulcer healed completely.

3. Rehabilitation :

ancouraged to walk and bear weight on the operated
limb. The patients were advised to use well padded
orthopsedic shoes. Those who could not afford shoes
were advised to get a soft rubber sole chappal or shoes.

The follow-up of the patients was done at monthly interval.

Assessment of the Results :

The results were graded as follows (Kush Kumar, 1979).

Good :- Ulcers healed with a healthy, stable scar and an improved gait without any pain and recurrence.

Fair :- Ulcers healed with a thin, unstable scar, persistence of mild pain on deep pressure, little or no improvement in gait pattern, no recurrence and patient usually dissatisfied.

POOK :- Ulcers failed to heal/recurred, thin, unstable and fragmented sear, painful on pressure, no improvement in gait and patient dispatisfied.

OBSERVATIONS

ODSERVATIONS

The present work is based on the study of 33 plantar ulcers in 30 patients of various types of leprosy admitted to M.L.B. Medical College and associated Hospital, Jhansi, from May 1982 to March 1983. During this period a total of 210 patients of various types of leprosy attended the hospital, out of which only 30 patients had trophic ulcers on one or both feet i.e. incidence of plantar ulcer observed is 14.3% (Table No. 1) (Fig. - IV).

Table 1
Showing incidence of trophic ulcers in leprosy.

Total No. of loprosy patients	Patients w	ith trophic ulcers Percentage
210	30	14.3

As evident from table No. 2, majority of cases (83.3%) with plantar were of non-lepromatous type of leprosy, whereas only 16.7% were of lepromatous type.

SHOWING INCIDENCE OF TROPHIC ULCERSINLEPROSY

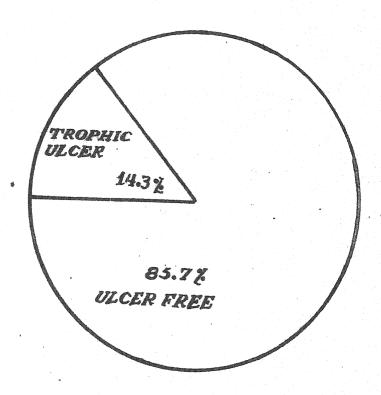


FIG. IV

Showing type of leprosy.

Type of leprosy	Cases				
	No.	Porcentage			
Lepromatous type (L)		26.7			
Tuberculoid (T)	40	4000			
Maculoanasthetic (MA)	2	6.6			
Polyneuritic (P)		50.0			
Borderline (B)	6	16.7			
Intermediate (I)	3	10.0			
Total	30	200.0			

It was observed that plantar ulcers occurred more frequently in aged as compared to young patients.

As swident from table No. 3, 73% of the cases were above 40 years.

Table 3
Showing age distribution.

go in	yoara	No.of patients	Percentage
20 -	30		20.00
30 -	40	2	6.67
40 -	50	8	26.67
50 -	60	10	33.03
60 -	70	11	13.33
otal		30	100.00

Table 2
Showing type of leprosy.

Type of leprosy	ADMINISTRAÇÃO PRINCIPAÇÃO PRINCIPA	
	No.	Percentage
Lepromatous type ((L) 5	16.7
Tuberculoid (7)	dep	No.
Maculoanasthetic ((MA) 2	6.6
Polyneuritic (P)	15	50.0
Borderline (B)	5	16.7
Intermediate (I)	3	10.0
Total	30	100.0

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Table 3
Showing age distribution.

go :	ln	λo	arı	3		JO.	.02	30	(1) (0)	Gr 160		Po	rcont	ago
20	sjap	30						6					20,00	
30	apple .	40						2					6.67	
40	400	50						0					26.67	
50	400	60						10					33.03	
60	etitie	70						4					13.33	

There was no significant difference in incidence of plantar ulcers as far as sex is concerned. However, the incidence was slightly higher (55.3%) in males as compared to females (46.7%) (Table No. 4).

Table 4
Showing sex distribution.

Sox	80.	Cases Percentage
Male	16	53.3
Female	14	46.7
Total	30	100.0

Sixteen of these cases (53.3%) were residing in urban areas whereas 14 (46.7%) belongs to rural area (Table No. 5).

Table 5
Showing distribution of cases on the basis of domicile.

Domici	10			No.	caron	Percentage
Aural				1.0		46,7
Uzbas				25		53.3
Total				30		100.0

All the cases in present study belongs to poor social status. Eighty percent of cases belongs to social class V and 20% belongs to social class IV. Hone of the case belong to social class I to III (Table No. 6).

Table 6
Showing social status.

Social class	No. Parcente					
4-15 - Andrew Control of the Control						
XV	6	20.0				
V	24	80.0				
Total	30	100.0				

Social class based upon the classification given by Prasad (1970) based on per capita monthly income. I (8. 300/- and above), II (8. 150 to 299/-)
III (8. 70/- to 149/-), IV (8. 30/- to 69/-),
V (8. less than 30/-).

Cut of 33 plantar ulcers, history of various trauma was present in 15 ulcers. Out of which 10 cases had history of thorn prick, 3 of stone prick and 2 nail prick (Table No. 7).

Table 7
Showing incidence of various traussa.

History	No.	eero Percentage
H/o trauma absent	20	54.5
H/o trauma present	15	45.5
A. Thorn prick	10	
B. Stone prick	3	
C. Nail prick	2	

	33	100.0

As evident in table No. 9, the rate of ulceration was higher (50.0%) when the patient had sensory loss of short duration upto 2 years.

Showing duration of sensory impairment in feet.

eation in years	No.	Percentage
0 - 2	25	50,00
2 - 4		26,67
4 6	2	6.67
Above 6		15.67

Duration of ulcers varied from 15 days to 2 years. Majority (79.0%) of ulcers reported within 6 months. Only 2 ulcers were reported after one year of developing the ulcer (Table No. 9).

Table 9
Showing duration of ulcers.

Duration of ulcers in months			10.	No. Percentage	
0 -	3		84	42.4	
3 -	6		12	36.5	
6 -	9		3	9.1	
9 -	12		2	6.0	
ore	-1103	13		6.0	
otal			3.3	100.0	

As evident from table No. 10, 24 patients have already taken some treatment for the ulcers here and there. Twenty of them were being treated only by repeated dressings. In 2 patients, the amputation of toes has already been done before they arrived to the hospital but wound refused to heal.

In 2 patients curettage has already been tried.

Showing previous treatment taken for ulcers.

Trootmon	it ta		No.	Percentage
Cloan an	d dr	esings	20	66.7
Plaster	of P	aris cast	460	AND THE PROPERTY OF THE PROPER
Surgery	(a)	Curettage	2	6.6
	(b)	Amputation	2	6.6
		estan resultativa (alian estante estan		
Total			24	80.0

The commonest site for these ulcers in the series was head of 1st metatarsal (33.4%) to be followed by involvement of phalanges to toes (27.3%). Phalanx of great toe was involved in 7 cases out of 9 cases. Involvement of 2nd and 3rd phalanges was of one case each. Third commonest site was head of 2nd metatarsal. Head of 4th metatarsal was least affected only in one case (3.0%) had ulcer at this level (Table No. 11) (Fig. - V).

SHOWING DISTRIBUTION OF ULCERS

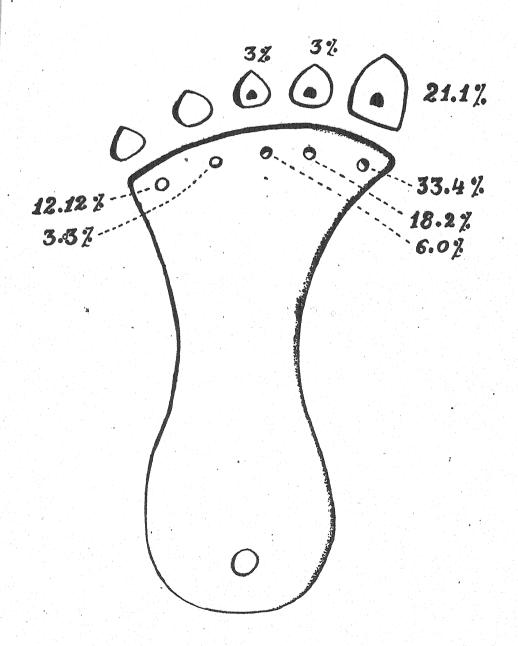


FIG. V

Table 11 Showing distribution of ulcers in sole.

site of	ulcers	No	Nergentage
lst M.T	. Head region	11	33,40
ina "	63	6	18,20
Bra "	**	3	6.06
leb "	(8)	2	3,03
ith "	49 69		12.12
halang	•	9	27,29
	a) Great toe	7	
	b) II toe	*	
	c) III too		

60.6% of total ulcers were graded as deep ulcers because the underlying deep structure were exposed and necrosed. So much so that in 13 cases of deep ulcers the offending bones were exposed and lying bare in the ulcer with destruction of underlying bone and joints. However, 13 ulcers were superficial ulcers (Table No. 12).

Table 12
Showing nature of ulcers.

	Ça.	
Nature of ulcers	1104	Percentage
Superficial	13	39.4
Deep	30	60.6
Total	33	100.0

vatery discharge. Foul smalling purulent discharge were seen in 18 cases and all of them were deep ulcers with necrosis of offending bone so much so that ulcers were full of maggots in 6 cases. Watery discharge was present in 6 cases most of them were superficial ulcers. Nine ulcers were free of any discharge as they were initial ulcers without any secondary infection (Table No. 13).

Teble 13 Showing nature of discharge from ulcars.

isture of	dischas		34	
				10.2
ratery				54.6
rurulent				27.8
io alochi				
otal.				100.0

Associated deformities were present in 12 cases only. Post drop and Hallum Valgus were the commonest deformities as compared to clawing of toes or absorption of toes (Table No. 14).

Table 14
Showing associated deformities.

Deformities		Cases No. Percentage			
Poot drop		3	10,00		
Mallux Valgue		3	10.00		
Claw toes		2	6.66		
Absorption of	too	2	6,66		
Amputation of	toes	2	6.66		
ota)		22	40.00		

Shows no abnormality of bone and joints. In remaining 90% cases concentric absorption of phalank was the universal finding. Sixty percent of cases had absorption of phalanges whereas destruction of underlying bone and joint was seen in 43.4% of cases. Sclerosis and ostetis were seen in 13.2% and 33.3% cases respectively. Diffuse rarefaction was seen only in 2 (6.6%) cases both of whom had severe pain and were not using the limb. However, the sequestrum was not seen even in single case (Table No. 15).











Table 15
Showing radiological findings.

Radiologica	l findings			2201 Porcentage	
no change				10.0	
Absorption	of phalange	s of toes	1.0	60.0	
Destruction	of bone &	joint	24	43.4	
Selerosis			4	13,2	
Coteltis			10	33,3	
Diffuse san	efaction		2	6.0	

In 13 of these cases the offending bone were excised through plantar approach as bones were lying bare in the wound. Rest 20 ulcers where bones were not exposed in the ulcer the offending bone were excised by dersal approach (Table No. 16).

Showing approach for resection of underlying bones.

Approach Gages No. Ferce		
Dorsal	20	60.6 39.4
Total	23	100.0

The healing time was 3 to 5 weeks in all the cases done by dorsal approach while in cases ulcers operated by plantar approach took longer time for healing i.e. 5 to 6 weeks (Table No. 17).

Showing healing time of ulcers in different approaches for resection of bone.

Operative approach	36.	Percentage					
Plantar approach	13	39.4	5	t o	6	wools	
Dorsal approach	30	60.6	3	to	5		
2otal	33	100.0	AND METASON				

All the ulcers took more than 3 weeks to heal.

Twelve of them healed in 3 to 4 weeks, 8 in 4 to 5

weeks and 13 in 5 to 6 weeks. By the end of six weeks
all the ulcers had healed well. None of them refuse
to heal by this treatment (Table No. 18).

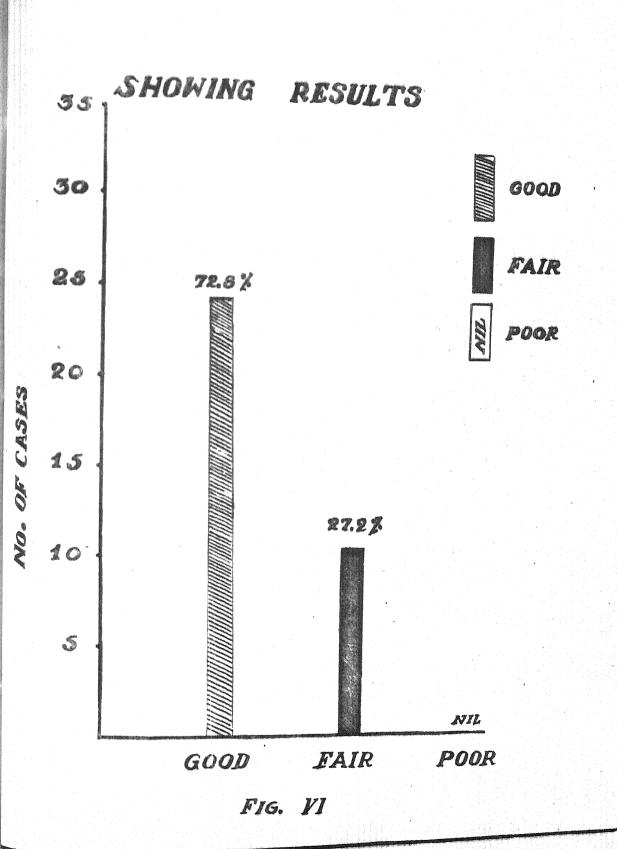
Table 18
Showing period of immobilisation.

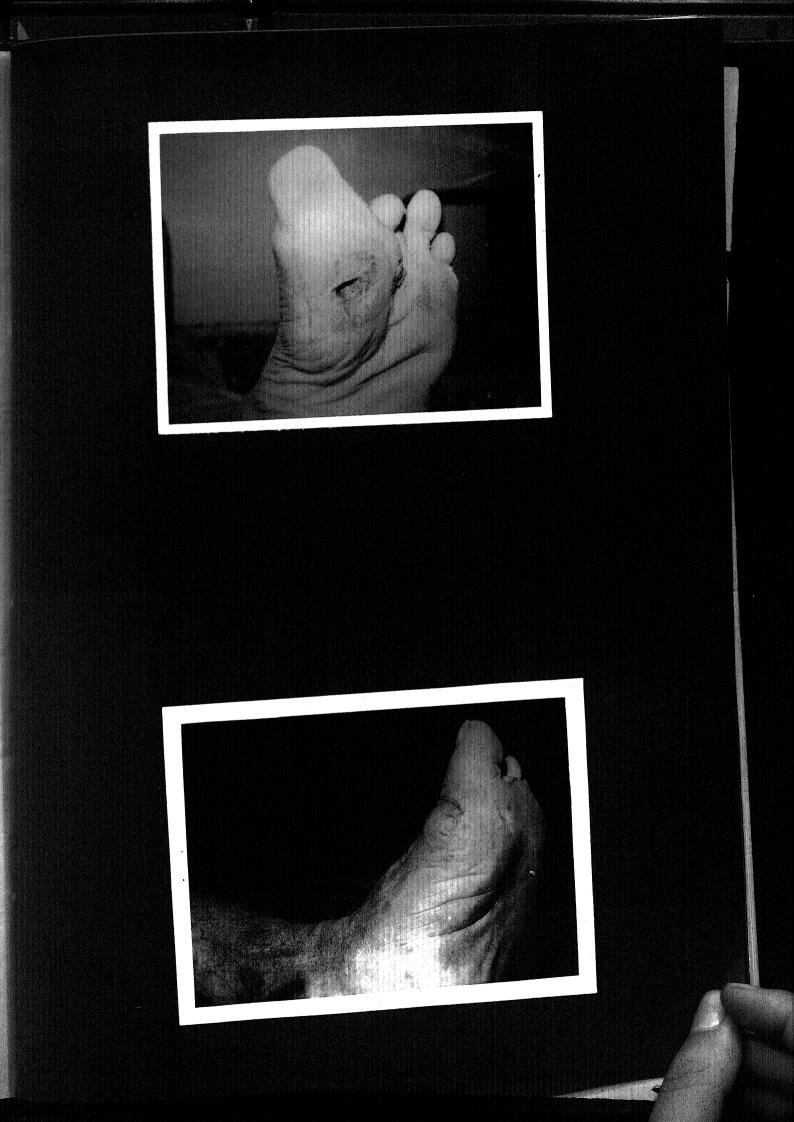
Duratio	n in vooks	70.	Poscentage
0 -	3	314.2	213.2
3 -	4	12	36.4
4	\$		24.2
5	6	13	39.4
Total		33	100.0

In the present study have been very encouraging. At the end of treatment the results graded good in 24 cases and fair in 9 cases. None of the cases could be graded as poor. Recurrence was not observed in any of the case, during follow-up of 3 months to 1 years of time (Table - 19) (Fig. VI).

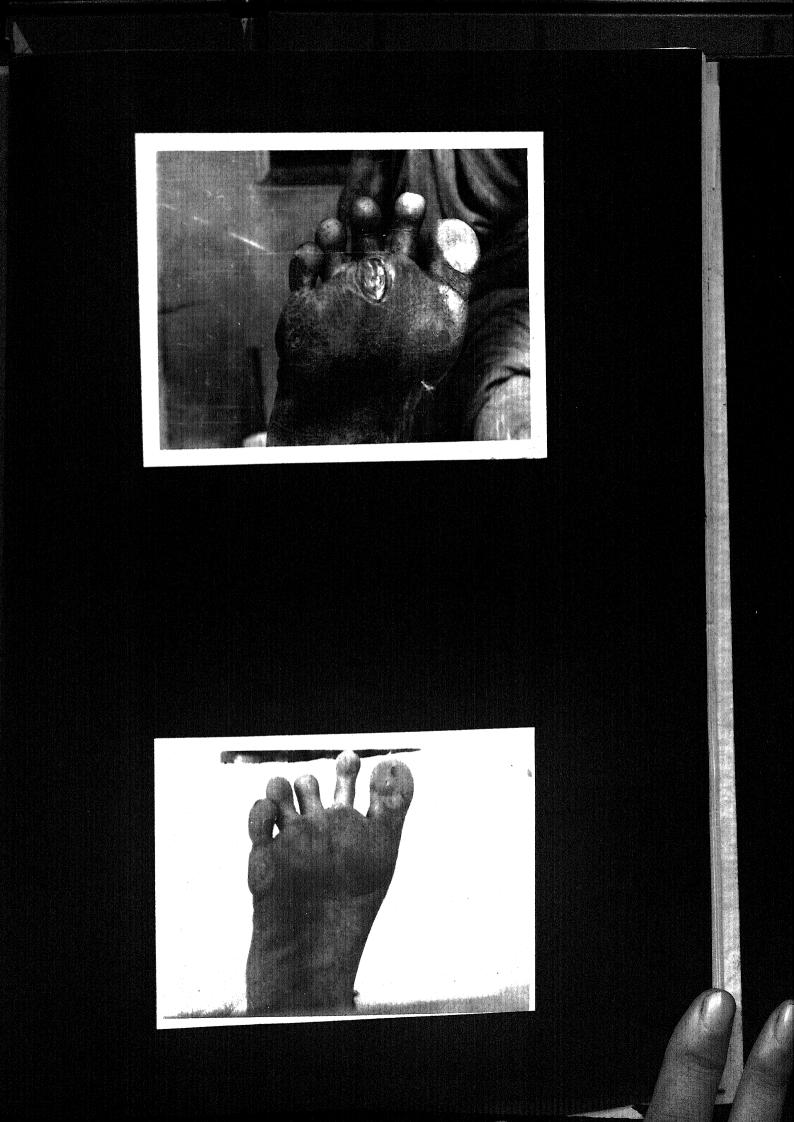
Table 19
Showing results of study.

Cosos					
Results		Porcent age			
Good	24	72.8			
Pals	9	27.2			
Poor	NAI	841			
Total	33	100.0			









DISCUSSION

This study presents numerous facts of clinical interests, because of their complexity. Surgical resection of underlying bone in plantar ulcers in leprosy was done in 33 plantar ulcers in 30 patients.

In incidence of plantar ulcers in the study
is 14.3% of the cases attended out patient department
of Leprosy, which is little higher than the other
workers. The incidence of plantar ulcers as estimated
by Hemerijkx (1959) was 9.3% and Srinivasan and
Uharmendra (1978) 10 to 20%. The ulcers were found
more in non-lepromatous leprosy 83.3%, which has been
also observed by Belsare et al (1979) and Prasad et al
(1981). It is probably due to early involvement of
merves leading to anaesthesia of the feet.

The male to Semale ratio was found to be

1.4 : 1 and maximum cases (73%) were above the age

of 40 years, which conside with the findings of

Keserwani (1976) and Kush Kumar (1979). All the

patients belongs to poor secio-economic status with

no significance in rural or urban population. The

finding was confirmed by Reservani (1976), Higam et al (1977). The most of cases were beggars by occupation and not even a single case detected from higher social status.

The criteria of the selection of patients
for resection of underlying bone was mainly based
in the cases of plantar ulcers of leprosy patient
in which frank discharge from the ulcers ceased with
the conservative treatment.

history of external trauma like, thorn prick, nail prick and stone prick as one of the causative factor for the plantar ulcers, which is also confirmed by Price (1959), Ross (1962), and Srivastava and Reservani (1976). All the patients in the present series were observed having complete or partial sensory loss in the feet. 50% cases had loss of sensation in the feet upto 2 years of duration which is in accordance with Nigem et al (1977).

In the present series 79% of the cases reported within 6 months of ulcer formation, while thermondra et al (1955) reported only 50% of his cases reported within 3 years of ulceration. This might be due to early motivation of the leprosy patients for treatment by leprosy workers. In the

present series 80% of the cases had already taken treatment which has been also confirmed by Pharmondra et al (1955).

(33.4%) were found over the head of the 1st metatarsal region, then the phalanx (18.2%) and the least number of ulcers found on 3rd and 4th metatarsal head region, only (9.09%). It has been also confirmed by Reservani (1976) but he had not included ulcers over the phalans. The 4th metatarsal head was observed to be the least common site for ulceration, while phalams were the 2nd most common site of ulceration as advocated by Mukherjee (1977) and Sminivasan and pharmendra (1978).

The associated deformities like foot drop and hallum valgus were found in 40% of the cases, but it has not effected much as a contributory factor for formation of the ulcers. We had found (60.6%) various type of deep ulcers and (39.4%) superficial in nature. The purulent discharge was present only in 54.6% of cases.

The radiological changes in the underlying bone was present in 90% of cases having absorption of phalanges of toes in 60%, destruction of bone and joint in 43.3%, eclarosis in 13.2%, diffuse rarefaction

that the infection in bones might be main cause for non healing of ulcers. The importance of surgical resection of underlying bone in plantar ulcers is because of fact that if such disease bone is taken out it will facilitate the healing of ulcers by two way. One main factor is pressure point from within is removed and secondly diseased bone is taken out. The resection of bone has been advocated by Bhasin & Antia (1972), Anderson (1975), Srivastava and Reserveni (1976), Rush Rumar (1979) and Pati et al (1981).

In the present series, the bone resection was done by plentar approach in 39.4% of cases in which the bone were lying bare in the ulcers. 60.6% of cases were subjected for dorsal approach to avoid the contamination of surgical wound from the infected ulcer site and for better exposure, in these cases bone were not lying bare in the ulcer.

The ulcers healed in 3 weeks time in 36.4% of cases while 73.6% of the cases took upto 6 weeks healing time.

The results in the present series were good in 72.3%, fair in 27.2% and in none of the cases poor results were noted. The recurrence was not observed during the follow-up of 3 months to 1 year of time.

Shasin and Antia (1972) reported 62.5% good results and Srivastava and Reservani (1976) achieve 95.7% of good results and 14.29% fair results, whereas Kush Kumar (1979) had obtained 92.1% good and 7.9% fair results. The results are slightly inferior to previous workers because previous workers had used only dersal approach. But in the present series result were as good as advocated by previous workers in the cases which were subjected for the dersal approach.

evaluated and the dorsal approach was found more suitable than plantar approach. This coincides with the observation of Shasin and Antia (loc it). Plantar approach had disadvantages like inadequate exposure while excising the underlying bone and delay in post operative wound healing.

The results of present series which are as good as given by previous workers, gives a strong indication in the treatment of plantar ulcers in leprosy by resection of underlying bone.

CONCLUSION

Eccoccoccoccoccoccoccoccoccoccocc

COMPLUSTON

The resection of underlying bone in the cases of plantar ulcers in leprosy was employed in 33 ulcers of 30 patients in various group ranging from 30 to 70 years by dersal or plantar approach. Evaluation of results done with follow-up of 3 menths to 1 year after operation. The indications, choice of technique and types of results were compared with those of previous workers. The following conclusions were drawn.

- The resection of underlying bone is indicated in all the cases of planter ulcers in leprosy.
- 2. The operation can be safely performed without any ansesthesia.
- 3. The operation should be done after ceasation of frank discharge from the wicer.
- 4. The external trauma is one of the causative factor for plantar ulceration. So feet must be protected by foot-wear.
- 5. The internal pressure is most important causative factor in plantar ulceration.

- 6. The underlying diseased bone also play part in causation of trophic ulcers.
- 7. The operation should be performed by dorsal approach, as healing time is also less and ulcer heal better than plantar approach.
- 8. The resection of underlying bone in trophic ulcers has a strong indication as the results are excellent by the procedure.

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